

# **TIRE PUMP WITH HIGH-PRESSURE AUDIO WARNING**

## **BACKGROUND OF THE INVENTION**

### **1. Field of the Invention**

5           The present invention relates to tire pumps and, more particularly, to such a tire pump that produces a warning sound when the tire pressure reached a predetermined set value.

### **2. Description of the Related Art**

          When inflating the tire of a vehicle with a tire pump, the operator may check  
10   the pressure status of the tire, preventing an excessively high or low pressure that affects safety driving of the vehicle. A tire pump for this purpose may be equipped with a pressure gage. When pumping air into the tire, the operator has to visually check the reading of the tire gage. If a tire pump without pressure gage is used to pump air into the tire of a motor vehicle, the user may have to press the tire with the hand in  
15   order to check the pressure status of the tire. There is known another structure of tire pump that has tire pressure control means that automatically discharge pumped air to the atmosphere when the inside air pressure of the tire reached a predetermined set value. Either one of the aforesaid conventional tire pumps is used, the user needs to check the saturated pressure status of the tire with the eyes or the hand, or by means of  
20   recognizing discharging status of air from one end of the barrel.

          Therefore, it is desirable to provide a tire pump that eliminates the aforesaid problem.

## **SUMMARY OF THE INVENTION**

          It is the primary objective of the present invention to provide a tire pump,  
25   which gives a warning sound when the tire pressure reaches a predetermined set value.

To achieve this objective of the present invention, the tire pump comprises a hollow barrel, a pump plunger, an air tube, an air nozzle, a regulating chamber, a regulating valve assembly, and an air whistle. The hollow barrel has an inside space. The pump plunger is provided at a bottom end thereof with a pump piston that is  
5 slidably inserted into the inside space of the barrel for pumping air. The air tube is connected to an end of the barrel in air communication with the inside space of the barrel. The air nozzle is provided at an end of the air tube. The regulating chamber is defined in between the barrel and the air nozzle and provided with a relief port. The regulating valve assembly has a regulating tube movable in the regulating chamber  
10 between a sealing position and a relief position. The air whistle is mounted in the relief port for producing a sound when the regulating tube shifted to the relief position where a flow of air passes from the inside space of the barrel to the relief port through the regulating chamber.

#### **BRIEF DESCRIPTION OF THE DRAWINGS**

15 FIG. 1 is plan view of a tire pump with high-pressure audio warning according to the present invention.

FIG. 2 is a sectional view of the present invention, showing the regulating tube shifted to the sealing position.

FIG. 3 is similar to FIG. 2 but showing the regulating tube shifted to the  
20 relief position.

#### **DETAILED DESCRIPTION OF THE INVENTION**

Referring to FIGS. 1 and 2, a tire pump in accordance with the present invention is shown comprising a pump body 10, a pump plunger 20, a valve tube 30, an air tube 40, an air nozzle 50, a regulating valve assembly 60, and an air whistle 70.

25 As shown in FIGS. 1 and 2, the pump body 10 comprises a hollow barrel 11,

and a base 12 coupled to the bottom side of the barrel 11. The barrel 11 has a transverse through hole 13 disposed at the bottom side above the base 12, and a top end cap 14 provided at the top side.

As shown in FIGS. 1 and 2, the pump plunger 20 has a pump piston 21  
5 fixedly provided at the bottom end thereof and inserted slidably into the barrel 11, and a top end extended out of the top end cap 14 and connected with a handle 22 through which the user can conveniently push and pull the pump plunger 20 to pump air.

As shown in FIG. 2, the valve tube 30 is mounted in the transverse through hole 13 with the two distal ends respectively extended out of the transverse through  
10 hole 13. The valve tube 30 has a big air passage 31 extended from one end toward the inside, a small air passage 32 extended from the inner end of the big air passage 31 to the other end of the valve tube 30, a through hole 33 in communication between the big air passage 31 and the inside space of the barrel 11, an air hole 34 in communication between the small air passage 32 and the inside space of the barrel 11,  
15 two seal rings 35 mounted on the periphery near the two distal ends and peripherally pressed on the peripheral wall of the transverse through hole 13 to prohibit leakage of air, and an one-way intake valve 36 mounted in the small air passage 32 and corresponded in location to the air hole 34 for enabling air to pass from the inside space of the barrel 11 to the small air passage 32.

20 As shown in FIG. 1, the air tube 40 is mounted in one end of the valve tube 30 and communicated with the small air passage 32. The air tube 40 can be a rigid steel tube, or flexible rubber tube selected subject to actual requirement.

As shown in FIG. 1, the air nozzle 50 is connected to one end of the air tube 40 remote from the valve tube 30. The air nozzle 50 can be a French-type design,  
25 US-type design, England-type design, or their combination.

The regulating valve assembly 60 is designed to be mounted in a regulating chamber defined in between the barrel 11 and the air nozzle 50. The tire pump is designed to have a relief port in one side of the regulating chamber for regulating the inside air pressure of the air tube 40. According to this embodiment, the regulating chamber is the big air passage 31, and the relief port is the open end of the valve tube 30. As shown in FIG. 2, the regulating valve assembly 60 comprises a regulating tube 61 axially movably mounted in the big air passage 31, and two O-rings 62 mounted on the periphery of the regulating tube 61 near the two distal ends and peripherally pressed on the inside wall of the valve tube 30 to stop air from passing between the small air passage 32 and the through hole 33 via the big air passage 31. The regulating tube 61 has one end closed and the other end opened. Further, the regulating tube 61 has a through hole 63. A seal ring 64 is mounted on the periphery of the regulating tube 61 between the through hole 33 of the valve tube 30 and the through hole 63 of the regulating tube 61 and peripherally pressed on the inside wall of the valve tube 30. The regulating tube 61 can be moved in the big air passage 31 to shift the seal ring 64 to a position in between the through hole 33 of the valve tube 30 and the small air passage 32 to stop air communication between the through hole 33 of the valve tube 30 and the through hole 63 of the regulating tube 61. At this time, the regulating tube 61 is in the sealing position. When moved the regulating tube 61 to shift the seal ring 64 to or over the through hole 33 of the valve tube 30, the seal ring 64 fails to seal the gap, and the through hole 33 of the valve tube 30 is in air communication with the through hole 63 of the regulating tube 61, for enabling air to pass from the through hole 33 of the air tube 30 through the through hole 63 of the regulating tube 61 into the big air passage 31 and then to flow out of the valve tube 30 via the aforesaid relief port. At this time, the regulating tube 61 is in the relief position.

A regulating knob 65 is threaded into the relief port of the valve tube 30. A spring member, for example, a spiral spring 66 is mounted inside the valve tube 30 and stopped between the regulating knob 65 and the regulating tube 61. By means of rotating the regulating knob 65 to compress the spring member 66, the pressure from  
5 the regulating tube 61 to block the small air passage 32 is regulated.

Therefore, when shifted the regulating tube 61 to the sealing position, the regulating tube 61 closes the passage between the big air passage 31 and the small air passage 32 with a predetermined pressure, and the inside air of the barrel 11 is prohibited from passing through the through hole 33 and the big air passage 31 to the  
10 outside. As shown in FIG. 3, when the internal air pressure of the small air passage 32 reaches a predetermined level, the air pressure will pushes the regulating tube 61 toward the regulating knob 65 to the relief position to shift the seal ring 64 to or over the through hole 33 of the valve tube 30, for enabling pumping air to pass from the inside space of the barrel 11 through the through holes 33 and 63 to the outside via the  
15 big air passage 31.

The air whistle 70 is mounted in the relief port. According to this embodiment, the air whistle 70 is a reed fastened to the regulating knob 65. When a flow of air passes through the big air passage 31 to the outside of the valve tube 30, the flowing air will pass over the regulating knob 65 and the air whistle 70, producing a  
20 clear sound.

By means of the aforesaid design, when the internal air pressure of the tire reached a predetermined pressure level set by the regulating valve assembly 60, air cannot be pumped into the tire. When continuously pumping the tire pump at this time, air will pass through the through hole 33 and the big air passage 31 to the outside and  
25 will simultaneously force the air whistle 70 to produce a clear sound. Therefore, it is

not necessary to check the pumping status or to use a tire pressure gage to measure the internal air pressure of the tire when pumping.

Further, the air nozzle, the pump body, the handle, the air tube can be obtained from conventional designs, or substituted by equivalent component parts.

- 5 Although a particular embodiment of the invention has been described in detail for purposes of illustration, various modifications and enhancements may be made without departing from the spirit and scope of the invention. For example, the installation of the regulating chamber and the regulating valve assembly is not limited to the bottom side of the barrel, and any of a verity of voice generating means may be used to
- 10 substitute for the air whistle. Accordingly, the invention is not to be limited except as by the appended claims.